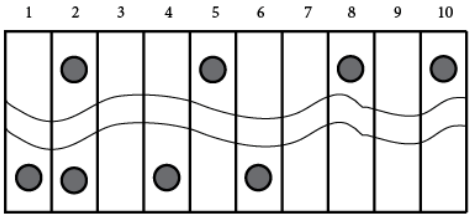
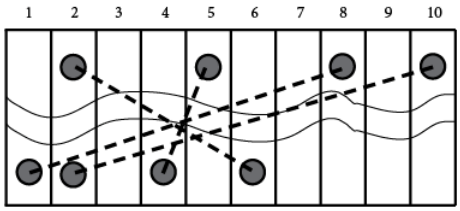
3. Dong-Sun

Program Name: DongSun.java **Input File: dongsun.dat**

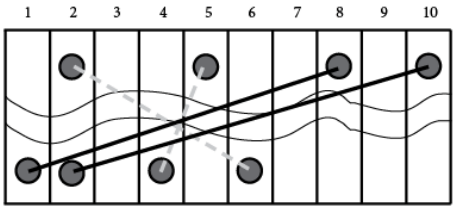
Dong-Sun is currently employed as a civil engineer building bridges in an area with an east-west running river and many cities on either side. These cities all have a lot of traffic between them, and many have filed bridge applications with his office. However, when looking through the applications, he's noticed that some have been filed that would intersect, which cannot be done, for obvious reasons.
The cities in Dong-Sun's area are labelled by their position along the north or south bank of the east-west running river. For example, here is cities 2, 5, 8, 10 on the north bank; and 1, 2, 4, 6 on the south bank:



The bridge applications that Dong-Sun has are bridges from city 10 to 2, 5 to 4, 2 to 6 and 8 to 1, These proposed bridges are indicated by the following notation, **`10 -> 2, 5 -> 4, 2 -> 6, 8 -> 1`**, with the first city of each notation pair always the one on the north side of the river, and the second one always on the south side. It is guaranteed that any proposed bridge will cross the river. The two north/south cities at position two tried to submit a `2 -> 2` bridge proposal, but missed the deadline.



Dong-Sun cannot build all these bridges because he can't approve bridges that intersect, but he does want to approve as many as he can. In this scenario, the most number of bridge applications he can approve is two, the **`10 -> 2`** bridge and the **`8 -> 1`** bridge, since these are the only ones that can be built without any bridges intersecting.



Given the bridge applications that Dong-Sun receives, in the notation from ***`north side city -> south side city`***, determine which bridges he should approve in order to provide the maximum number of bridges built for use by the cities.

Input: The first line, N, will be the number of data sets to follow. The first line of each data set will be the number of applications, I, which Dong-Sun has received. The next I lines will be the bridge applications in the form ***`north side city -> south side city`***, where ***`north side city`*** and ***`south side city`*** will be integers representing their location along the river bank.

Output: For each data set, output the applications that Dong-Sun can approve, in the order they were initially given. The output should be prefaced by "Approved Applications: " followed by a comma separated list of the approved bridge applications.

Dong-Sun - Sample input:

```
3
4
10 -> 2
5 -> 4
2 -> 6
8 -> 1
10
3 -> 4
1 -> 2
2 -> 3
6 -> 7
10 -> 1
8 -> 9
4 -> 5
9 -> 10
5 -> 6
7 -> 8
6
1 -> 15
2 -> 8
8 -> 3
9 -> 2
10 -> 2
11 -> 15
```

Sample output:

```
Approved Applications: 10 -> 2, 8 -> 1
Approved Applications: 3 -> 4, 1 -> 2, 2 -> 3, 6 -> 7, 8 -> 9, 4
-> 5, 9 -> 10, 5 -> 6, 7 -> 8
Approved Applications: 9 -> 2, 10 -> 2, 11 -> 15
```